MSCP Bat Surveys	All Bat Species	San Diego Co./USGS	Final in 2004	$103,480	Payable – Local Assistance	Fisher
Pacific Pocket Mouse Habitat Soils Analysis	Pacific Pocket Mouse	San Diego State Univ.	Final in 2003	$91,140	Section 6	Lawhead
Orange Co. CA Gnatcatcher & Cactus Wren Monitoring	Calif. Gnatcatcher and Cactus Wren	Nature Reserve of Orange Co. (NROC)	Final	$42,360	Payable – Local Assistance	Lawhead
NROC Vegetation Monitoring	All Vegetation Types	NROC	In progress	$45,200	Payable – Local Assistance	Osborne
Orange Co. Carnivore Monitoring	Carnivores	NROC	In progress	$32,760	Payable – Local Assistance	Tippets
Orange Co. Avian Productivity and Survival	Birds	NROC	Final	$31,856	Payable – Local Assistance	Fritz
Orange Co. Ant Monitoring	Ants	NROC	Final in 2003	$23,000	Payable – Local Assistance	Tippets
Sensitive Plant Inventory – MSCP	Sensitive Plant Species	Co. of San Diego	Final	$110,000	Payable Local Assistance	Osborne
MHCP Biological Monitoring Plan	MHCP Covered Species	Conservation Biology Inst.	Final	$23,232	Payable – Local Assistance	Lawhead
MSCP Monitoring & Management Protocol Herpetofauna/Monitoring Database Development	MSCP Herpetofauna	San Diego State Univ./USGS	In progress	$288,659	Payable – Local Assistance	Tippets and Miller

VII. DEPARTMENT RESEARCH AND SPECIAL PROJECTS

Current Monitoring Research Projects

The following section presents current research being conducted by the Monitoring Team and Department biologists, either solely or in conjunction with other agency and/or non-agency personnel. Where applicable, these projects are completed, described in manuscript form and submitted to various peer-review journals for publication.

RESEARCH: Southern Steelhead Trout Research (submitted for review to California Fish and Game Journal in August of 2002) Biologist: Tim E. Hovey (Department)

During the spring of 1999 a small population of southern steelhead trout was discovered in San Mateo Creek in northern San Diego County. Immediately after the discovery, the California Department of Fish and Game (Department) initiated a program to monitor the status of the southern steelhead trout population of San Mateo Creek. Since that time a total of 40 Department-lead surveys have been conducted on the drainage.

Current Status of Southern Steelhead/Rainbow trout In San Mateo Creek

Tim E. Hovey
California Department of Fish and Game

Southern steelhead/rainbow trout occupying the San Mateo Creek drainage in San Diego County, California have been continually monitored with routine California Department of Fish and Game surveys from December 1999 to August 2002. Trout presence on San Mateo Creek (SMC) began to decline shortly after the surveys began and trout have not been detected on SMC proper since August 2000. Juvenile trout were discovered on Devil Canyon Creek (DCC), a tributary of SMC in May and June 2000 and adults continue to be present within the confluence. Data on water temperature indicates that temperature is more stable in DCC than in SMC. We assume that this enhances survival of steelhead in DCC. Genetic analysis established that at least two pairs of anadromous steelhead entered the drainage in 1997 to spawn and that successful F2 reproduction has occurred in DCC. Age analysis of a single adult individual indicates that maturing F2's currently occupy DCC. Observed spawning behavior and monitoring evidence gathered during this study suggests that the original steelhead trout spawned in DCC and not SMC. Water availability and the presence of exotic fish species continue to be the two main factors influencing trout survival on the San Mateo Creek drainage.

During the spring of 1999, southern steelhead/rainbow trout (*Oncorhynchus mykiss*) were discovered occupying San Mateo Creek (SMC) and Devil Canyon Creek (DCC) in San Diego County, California. All individuals observed were established to be Parred individuals using the steelhead life-stage assessment protocol. Genetic analysis conducted on fin-clips collected (SM412199F) from two individuals revealed that each specimen carried the mitochondrial DNA (mtDNA) haplotype MYS5, a haplotype that is most commonly found in southern California steelhead and has never been seen in any hatchery population of steelhead or rainbow trout (Nielsen 1994). Otolith microchemistry performed on a single sagittal otolith by researchers at The Department of Fisheries and Wildlife at Oregon State University showed that the strontium/calcium ratio established the examined fish as a F1 progeny of an anadromous female (Department steelhead report, 2000; Rieman et al.1994). Aging analysis of a single otolith reliably aged the trout at 2+ years of age. Back calculations confirm that the anadromous steelhead adults most likely entered the San Mateo drainage during a high water period in the early spring of 1997 to spawn. This information and additional monitoring observations were combined and submitted as an original report to the National Marine Fisheries Service (NMFS) by the California Department of Fish and Game (Department) in February 2000. Immediately following the 1999 re-discovery, the Department initiated a monitoring program to track the status of the steelhead/rainbow trout population on SMC.

Before the discovery in 1999, it was generally concluded that altered habitat was the major influence in the decline of the southern steelhead trout south of Malibu Creek, California. Southern California stream communities are heavily impacted by continued urban development and habitat alteration. Urbanization frequently puts increased

pressure on groundwater resources that are already overtaxed, creating fluctuations in seasonal water availability. These alterations can leave a stream waterless or transform flowing creeks into a series of pooled habitats, environments that strongly favor nonnative fish species (largemouth bass and green sunfish) over natives. And while San Mateo Creek has been afforded a small degree of protection from these impacts due to its location on Marine Base Camp Pendleton and Forest Service property, nonnative fish species currently occupy the entire creek.

Exotic fish species like, largemouth bass (*Micropterus salmoides*), green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*) and black bullhead (*Ameiurus melas*), have been present in great numbers within the San Mateo Creek drainage for many years (USFWS status report, 1996; Woelfel 1991) and have been shown to have a strong competitive edge over resident trout. Green sunfish have been found to feed on juvenile trout and out-compete adult steelhead for benthic food (Swift 1975; Greenwood 1988). Largemouth bass take over as top predator in the habitat they occupy and can directly predate steelhead (Stouder et al, 1997). Black bullhead are highly tolerant of high water temperatures and low dissolved oxygen levels and are extremely prolific. By shear numbers, this species can exert a tremendous competitive pressure on an already limited resource. The presence of these species within San Mateo Creek, a drainage that experiences unreliable stream flow for immigrating adults and emigrating smolts (Lang et al. 1998), and urban alteration convinced most fisheries experts that southern steelhead trout had been extirpated from this drainage for many years.

Southern steelhead historically occurred from Santo Domingo River in northern Baja California to Malibu Creek, California. However, consistent steelhead presence has not been observed south of Malibu for the last 50-60 years. Historical records show that San Mateo Creek may have been one of the most important steelhead spawning streams on the south coast. Consistent, and in many cases large, steelhead trout runs were recorded for San Mateo Creek in the early part of the twentieth century (USFWS Report, 1998). However, trout sightings dropped off in the forties and the fifties and consistent trout abundance has not been present within San Mateo Creek in the last 50 years (USFWS Report, 1995). Due to the decline in quality habitat and the absence of steelhead trout in southern California, the National Marine Fisheries Service declared the southern steelhead trout, *Oncorhynchus mykiss*, extinct south of Malibu Creek, California in 1997.

Between August 1999 and July 2002, Department biologists conducted 30 surveys on the San Mateo Creek drainage to monitor the steelhead/rainbow trout population. All surveys were concentrated upstream of the USGS gauging station (No. 11046300) on Camp Pendleton property to the Devil Canyon confluence and included the entire Devil Canyon Creek drainage (Fig. 1). An additional 3.4 kilometers of San Mateo Creek above the Devil Canyon Creek confluence were infrequently surveyed. Prior research by the USFWS in 1998 had concluded through habitat typing that the area from Interstate 5 to the gauging station is probably used as a migratory corridor by steelhead trout when flow conditions are right and the habitat above the Base in the Cleveland National Forest would be more suitable to support small populations of steelhead (USFWS status report, 1998). Woelfel (1991) agreed that stream flow from the ocean to above the Base

property near the gauging station served as a corridor for migrating steelhead and classified some spawning habitat within the Cleveland National Forest as excellent. Additionally, downstream of the gauging station, the creek goes dry for most of the year and all of the observations made during the 1999 discovery were located upstream of the USGS station.

During this three year monitoring study additional data was collected on general observations, spawning behavior, genetics analysis, temperature variance between drainages, impacts of exotic fish species on trout and age at growth.

In July 2002, The National Marine Fisheries Service listed the southern steelhead trout, *Oncorhynchus mykiss* as endangered and the individuals currently occupying the San Mateo Creek drainage represent the southernmost documented population of this species.

The objectives of this article are to: 1) provide an outline of the monitoring observations and data gathered on the drainage since the discovery in 1999; and 2) to illustrate the current status of the southern steelhead/rainbow trout in San Mateo and Devil Canyon Creek.

The entire manuscript is available upon request from Fisheries Biologist Tim E. Hovey.

RESEARCH: Bullfrog impacts on native systems (in Review)
Biologists: Tim E. Hovey (Department) and Darrin R. Bergen (Department)

The exotic bullfrog, *Rana catesbeiana* is a highly adapted, omnivorous frog that has been shown to negatively impact California's native aquatic organisms. Its prolific nature and ability to inhabit and thrive in questionable water sources, illustrates its adaptability. The tadpole stage of the bull frog possess a tetrodontoxin on the skin, making the larvae unpalatable to predators. The time period from tadpole to metamorphosis in the California climate can be as short as six months and juvenile metamorphs are preyed upon by larger bull frogs and little else. Reproductive maturity can be achieved in two-three years and adult females can produce from 20,000 to 50,000 eggs in a single season. Adult bull frogs are extremely difficult to capture and once disturbed, may hide on the bottom of a creek or pond for well over several hours.

In open pond and lake systems, adequate methods of control may be futile. However, in creek or stream systems, the geography of these waterways may prove advantageous for control of the bull frog. Additionally, in dryer years, isolated pools will concentrate the adults and if proper removal efforts are employed, they may succeed in controlling propagation and in some cases significantly impacting the population. Coupling repeated efforts with the control of the larvae, either with pool seining or the natural evaporation of inhabited pools during the dry season and control can be obtained.

During the 2001 and 2002 season, three drainages were selected for a focused exotic removal research project. Those drainages were San Juan Creek, San Mateo Creek (upper and lower) and Boden Canyon Creek, located on Department property. The research project was centered on the predatory and competitive impacts of the non-native bullfrog on native systems. We wanted to analyze the prey items chosen by bullfrogs in certain habitats. A total of 500 bullfrogs were collected from these three drainages. Each frog was weighed to the nearest tenth of a gram and measured to the nearest millimeter snout-urostyle length (SUL). The stomachs contents of each animal were removed and analyzed under a dissecting scope. Items were identified as specifically as possible, weighed and counted. The food item data was expressed as an index of relative importance (IRI) and graphed according to the top five items ingested.

Figure 25.
Scientific aid, Dan Marschalek and Department Biologist Darrin Bergen remove and analyze prey and food items from the stomachs of bullfrogs.

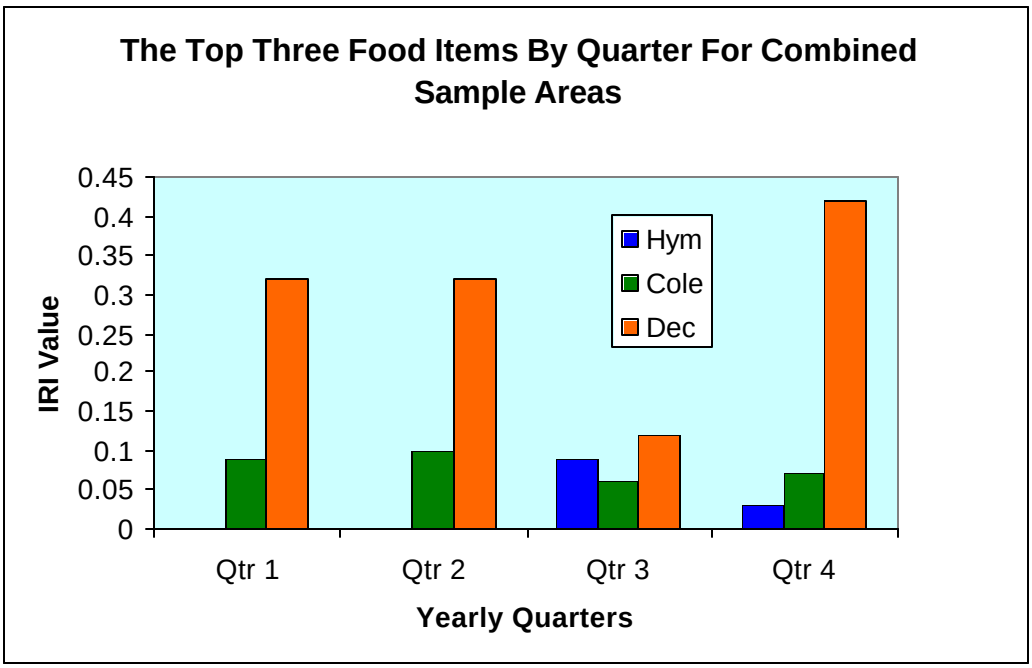

Figure 26. Diet by quarters: (January – March, April – June, July – September and October – December) for all sample locations combined. Crayfish is the dominant prey item for all four quarters (IRI by quarter respectively = 0.33, 0.32, 0.13 and 0.43).

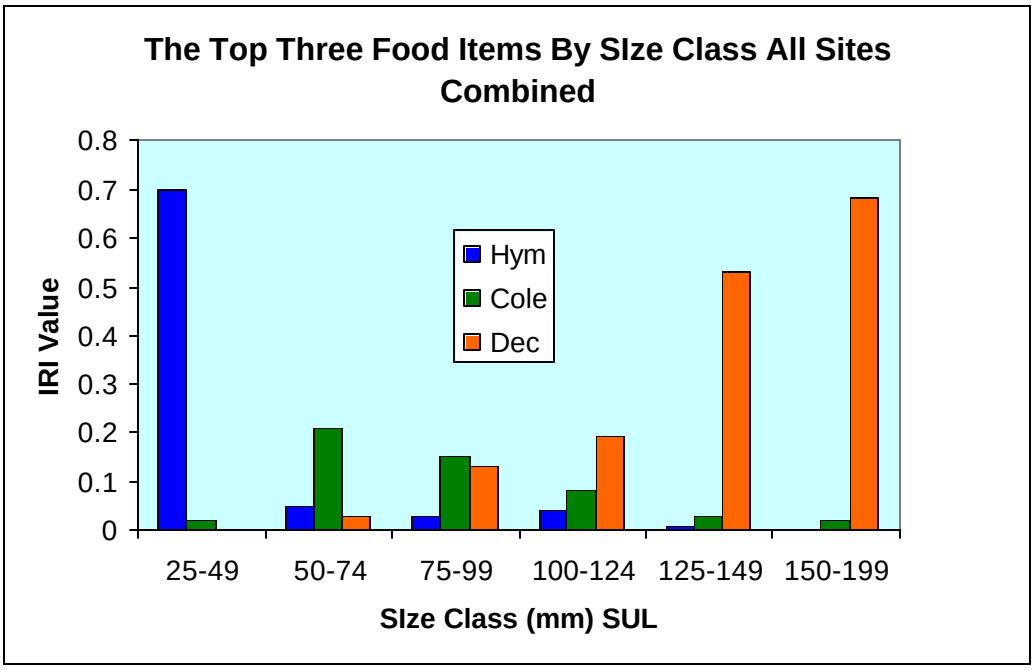

Figure 27. Diet by size class: Size classes were arbitrarily divided into six groups by length (SUL) mm. ((1) 25-49, (2) 50-74, (3) 75-99, (4) 100-124, (5) 125-149 and (6) 150-199). The size of food items are shown to correlate with frog lengths as expected. Bees (Hymenoptera) are small food items, beetles (Coleoptera) are classified as medium food items and crayfish (Decapoda) were classified as large food items.

The data illustrated in Graph 1 indicates that Decopods or crayfish are the dominant food item for the bull frog for each quarter as represented by IRI value. The quantity and size of the decopods, as represented by the combined IRI value overshadow the fact that crayfish were not present at the Boden Canyon sampling location. While it was perceived as a benefit to remove the bull frog from the three drainages, implications of removing a primary exotic predator (bull frog) that feeds on a secondary exotic predator (crayfish) should be investigated.

The data illustrated in Graph 2 show expected results. The food items and the IRI values increase as the size of the bull frog increases. This data graph was produced to illustrate the top food items per size of bull frog. This information is slated for submission in journal form in 2003.

RESEARCH: New account of native, special concern snake species consumed by Rana catesbeiana (Herpetological Review – in print December 2003)
Biologists: Tim E. Hovey (Department) and Darrin R. Bergen (Department).

While conducting the bullfrog stomach analysis, we discovered that one of the food items had not been previously recorded as a prey item of *Rana catesbeiana*. The prey item was a two-striped garter snake (*Thamnophis hammondii*), a special concern species for the state of California. The current state status of the snake and the fact that in the analysis of over 500 bullfrog stomach samples, it was the only species of snake found, made this information noteworthy. The data was written up in note form and submitted to Herpetological Review in January of 2003. It was accepted for publication in February of 2003 and is due for publication in December of 2003. A draft copy of the note is attached.

Note: *Rana catesbeiana* Predation

AN02-80
RANA CATESBEIANA (Bullfrog) PREDATION. Rana catesbeiana is known to eat a variety of small vertebrates including snakes (Bury and Whelan 1984. Ecology and management of the bullfrog. U.S. Dept. Interior, Fish Wildl. Serv., Resource Publ (155):1-23, and references therein).

Table 14 provides data on bullfrogs from the San Mateo Canyon Wilderness Area on the upper portion of the San Mateo Creek drainage, in the Cleveland National Forest, Riverside County, California (T7S, R5W) that contained Thamnophis hammondii in the stomach contents. The condition of the prey items collected on 20 June and 24 July suggested they had been recently consumed.

Table 14. Bullfrog, Rana catesbeiana and prey, Thamnophis hammondii collected in Riverside County, California, during 2001.

Date	Bullfrog sex	Snake SVL (mm)	Snake Mass (g)	Bullfrog mass (g)	Bullfrog SUL (mm)
20-Jun-01	Female	501	35.2	402.1	140
24-Jul-01	NA	220	3.38	154.7	108
24-Jul-01	Female	197	2.97	223.5	130
22-Aug-01	Male	185	2.82	51	86

In the examination of the stomach contents of over 500 bullfrogs collected from three California drainages no other snake species was observed. While anecdotal information may exist on bullfrogs consuming native California snakes, to the best of our knowledge this report is the first repeated account of bullfrog consumption of the two-striped garter snake, T. hammondii, a species of special concern for the State of California.

Submitted by TIM E. HOVEY, California Department of Fish & Game, 4949 Viewridge Avenue, San Diego, California 92123, USA, and DARRIN R. BERGEN, California Department of Fish & Game, 8604 La Jolla Shores Drive, La Jolla, California 92037, USA.

Figure 28. Thamnophis hammondii as a prey item in the nonnative bullfrog. Photo by Tim E. Hovey

RESEARCH: Post-fire impacts of Herpetofauna.
Biologist: Tim E. Hovey (Department) and Jenny O'Brien (Department)

In the summer of (August 16th) 2001, the Orosco Ridge fire burned roughly 1,000 acres through the Boden Canyon Ecological Reserve (BCER). Prior to the blaze, preliminary bio-inventory had been conducted in the area, resulting in a substantial herpetofauna list. Department biologists decided that the post-effects of the fire on small mammals, invertebrates and reptiles and amphibians would be valuable information for prescribed fires on ecological reserves and for future land management.

Approximately three weeks after the fire, a pitfall array was constructed in the burned area to observe the re-colonization or re-distribution of animals within the disturbed area. Similarly, an additional pitfall array was constructed in an area that had not been impacted by the fire, within similar habitat and at the same elevation in BCER. The traps were opened for a period of three to four days, every other week, for an entire year.

The object of this research is to compare species diversity and species abundance of reptiles, amphibians, mammals and inverts between the burned area (disturbed) and the non-burned area (undisturbed) over the course of a year.

Currently these data are being analyzed and the information will be submitted for publication.

RESEARCH: Spatial and Temporal Comparison of Sampling Techniques.
Biologists: Tim E. Hovey (Department) and Eric Waardenberg (Department)

Surveys techniques for amphibians and reptiles have relied mostly on those collected in pitfall arrays. While long considered the industry standard, arrays have a few negative sampling aspects. Once an array is in place it cannot be moved or relocated without substantial effort. The device itself impacts the habitat considerably once installed, and the trap will undoubtedly collect and kill non-target animals when sampling. The array must also be opened and closed for each sample period. Their conspicuous nature also invites unwanted attention and often portions of the array are vandalized or opened when they are not supposed to be sampling. This results in the death of target and non-target animals due to exposure. Cost is also a factor; a single array may cost around $200.00, not including the labor to install it.

It is for these reasons that the monitoring team began to evaluate other sampling techniques for obtaining reptile and amphibian diversity and abundance. A search of the literature revealed that coverboards (2 ft. X 2 ft. pieces of ¾ inch plywood) were frequently utilized for herpetofauna sampling. Papers by Tietje and Vreele and 1997, describe use of coverboards in conjunction with pitfall trap array data to compare sample techniques. However, these studies did not compare the two techniques in a spatial or temporal design. The SCR monitoring group designed a research project that would compare both techniques at the same sampling locations and during the same time of year.

In June of 2002, three reptile arrays were installed at Hollenbeck Canyon Wildlife Area. Directly adjacent to the arrays, and located within the same habitat type, an array of coverboards, was placed. Nine coverboards with placed in a 3X3 grid, spread out over a 50 meter X 50 meter area. The cover boards were checked at the same time the pit fall arrays were open and sampling. Currently data is being collected on species diversity and species abundance within each sample technique.

SPECIAL PROJECT: California Bird Species of Special Concern Project Update
Biologist: Lyann Comrack (Department), Project Manager

Summary:

The purpose of this project is to develop and produce a document and supporting materials entitled "California Bird Species of Special Concern 2003, A Ranked Assessment of Species, Subspecies and Distinct Populations of Birds of Immediate Conservation Concern in California". Completion of the project will allow the Department to 1) assess the quality and quantity of available data on native birds (especially nongame species), 2) develop a process which can be objectively evaluated, refined and used for future conservation priority-setting exercises, 3) identify imperiled bird species which merit consideration for listing or other immediate protection, and 4) develop a ranked list of bird taxa which represent priorities for bird conservation in California.

Background:

The Department established an administrative designation, "Species of Special Concern," in 1978 with the publication of a document entitled "Bird Species of Special Concern in California." The designation was intended to identify those species that were either declining or vulnerable and may warrant listing under the California Endangered Species Act (CESA) or federal Endangered Species Act (ESA). Since its inception, and with the passage and implementation of the California Environmental Quality Act (CEQA), the Species of Special Concern designation has been used extensively by Department personnel to identify those species that may meet the definition of "rare, threatened or endangered" in CEQA Guidelines §15065 for purposes of establishing appropriate project avoidance and mitigation measures; by local governments in the land use planning and project planning process to identify land use opportunities and constraints; by Department biologists to focus limited non-game research and management resources; and to assist in the decision-making process regarding sensitive species to cover in NCCP planning efforts.

Revision of the "California Bird Species of Special Concern" (hereafter BSSC) document began in 1993. The emerging discipline of conservation and research priority ranking, supported by a significant body of literature, provided the impetus for a decision by the Department to increase the scope of the California Bird Species of Special Concern project from an earlier to its present, more scientifically rigorous, form.

Methods:

In January 1998, the Department formed a Technical Advisory Committee (TAC), whose expertise extended throughout California, to 1) draft a new definition for Species of Special Concern, 2) develop criteria, based on published literature modified to address factors specific to California, to distinguish Species of Special Concern from among nominee taxa, and 3) provide peer review and guidance for scoring and evaluating taxa. A group of over 290 bird taxa was selected for BSSC consideration and were scored against seven objective criteria, as follows:

Population Trend (PT)

This criterion estimates the change in a taxon's population size from the time of the publication of Grinnell and Miller (1944) to the present. Scores are based on quantitative or anecdotal data on the magnitude of population change or, if lacking, data on changes in the availability or condition of a taxon's habitat. Taxa may be given a 0 for population trend, even if the California population is declining, if the overall population is stable or increasing and the decline in California results from a geographic shift in the range that was *not* caused by habitat loss or degradation or other threats in California (e.g., Cackling Canada Goose).

Population size:	Score
seriously (>80%) reduced	20
greatly (>40-80%) reduced	15
moderately (>20-40%) reduced	10
slightly (>10-20%) reduced or suspected of having been reduced but trend unknown	5
stable (<10% reduced) or increasing	0

Range Trend (RT)

The range trend criterion estimates the change in the size of a taxon's breeding or wintering range in California from the time of publication of Grinnell and Miller (1944) to the present. Scores are based on gross changes to a taxon's range polygon (i.e., the outlying boundary of the range). Taxa that currently do not breed in the majority of years in an area where they formerly bred annually are treated as quasi-extirpated there, and, hence, the area is considered unoccupied for the purposes of calculating range trend (or size). When more thorough data are lacking, range trend can be inferred by loss of habitat. The trend does *not* estimate the extent of local extirpations within the overall range. Taxa may be given a 0 for range trend, even if the California population is declining, if the overall population is stable or increasing and the reduction in the California range results from a geographic shift in the range that was *not* caused by habitat loss or degradation or other threats in California.

Range size:	
seriously (>80%) reduced	20
greatly (>40-80%) reduced	15
moderately (>20-40%) reduced	10
slightly (>10-20%) reduced or suspected of having been reduced but trend unknown	5
size stable (<10% reduced) or increasing	0

Population Size (PS)

This criterion estimates the number of individuals of a taxon in California during the season of concern (breeding, wintering or otherwise).

Population size:	
<1000 individuals	10
=1000 but <10,000 individuals	7.5
=10,000 but <100,000 individuals	5
=100,000 but <1,000,000 individuals	2.5
>1,000,000 individuals	0

Range Size (RS)

The range size criterion estimates the percentage of California occupied by a taxon, measured by the range polygon's outlying boundary, i.e., *not* by summing the size of all areas of local occupation within the overall range. Taxa that currently do not breed in the majority of years in an area where they formerly bred annually are treated as quasi-extirpated there, and, hence, the area is considered unoccupied for the purposes of calculating range size (or trend). Seabirds or other waterbirds restricted solely to coastal estuarine, inshore, or pelagic waters are evaluated based on the marine environment from the California coastline west 200 miles(American Birding Association Checklist Area). All other species are evaluated based on terrestrial California, i.e., the political boundary of the state exclusive of ocean waters. This criterion is more difficult to apply for seabirds or waterbirds using ephemeral wetlands in the interior than for solely terrestrial taxa. Still, as the range is determined from the outlying boundary, estimation of its size need not take into account periodic or frequent local shifts in distribution reflecting patchy or ephemeral features in response to changing currents or upwelling patterns, or drying of wetlands during drought, but should instead focus on the broad pattern of distribution over a period of years representing the normal range of environmental variation.

Range size (% of California occupied):	
=10%	10
>10%-50%	5
>50%	0

Percentage of Entire Range within California (EN)

This criterion measures what proportion of a taxon's North American range or population occurs within California. Taxa with a high proportion of their range or population within California are considered of greater concern than taxa with only a small proportion of their range or population in the state.

Proportion of North American range and/or population within California:	
100% (endemic)	10
>80% but <100% (near-endemic)	7.5
>50%-80%	5
>20%-50%	2.5
$\leq$20%	0

Population Concentration (PC)

This criterion estimates how concentrated a taxon currently is within its California range during critical life stages (e.g., breeding, migration). Highly concentrated taxa generally are considered more vulnerable to habitat loss, predation, disease, or other catastrophic events than are widely dispersed taxa. For example, an endemic subspecies of a landbird

might be very vulnerable to a catastrophic fire on one of the Channel Islands. This criterion defines a "site" as any more-or-less disjunct habitat island, including true islands (or offshore rocks) in the ocean or a lake or river, isolated headlands, well-bounded water bodies or wetlands (e.g., coastal estuary, lake, isolated salt marsh), "sky islands" (habitats high on mountain peaks and isolated from similar habitat on other distant peaks), or other well-isolated or fragmented habitat patches. The criterion should be used with caution for taxa that are not colonial breeders.

Majority (>50%) of population concentrated at:	
1-3 sites.	10
4-30 sites.	5
>30 sites.	0

Impact of Threats (THR)

This criterion estimates the approximate impact of realized known threats and (secondarily) potential irregularly occurring catastrophic events (e.g., oil spills, disease events) known to periodically affect some taxa. Scores are based on projected long-term realized impacts of single or multiple threat factors and not on speculative threats for which there is no reasonable basis or historic precedent.

In the next 20 years, habitat loss, habitat degradation, or other human induced threats are projected to:	
seriously reduce (>20%) a taxon's population in California	20
greatly reduce (>15-20%) a taxon's population in California	15
moderately reduce (>10-15%) a taxon's population in California	10
slightly reduce (>5-10%) a taxon's population in California	5
have no substantial net impact, i.e., a taxon's population should remain stable ($\leq$5% reduced) or increase in the next 20 years	0

A final draft list of scored taxa was developed and a ranking scheme to identify taxa warranting inclusion on the BSSC list was developed. On the basis of preliminary scores, two ranking methods were used - one linear and the other categorical – to identify taxa for inclusion on the BSSC list as a whole and further discriminate within three levels of conservation priority. Eighty one taxa were ultimately included on the draft list.

To complete the written BSSC document, including the methods, results, analysis, and recommendations sections, the Department entered into a contract with the Point Reyes Bird Observatory (PRBO) in 2001. Individual species accounts and range maps were concurrently completed by biologists considered to be experts with each BSSC taxon. An internal (Department) and external peer review process is currently underway. The final document, including species accounts and range maps, will be published as a special monograph of the Western Field Ornithologists (WFO) in collaboration with PRBO and

the Department. A web version and other electronic media will further our goals for distribution of, and access to, the BSSC monograph.

Results:

To ensure the ranking criteria and scheme would be consistent with the concept of a species of special concern, *Bird Species of Special Concern in California* are defined as:

Those species, subspecies, or distinct populations of native birds that currently satisfy one or more of the following criteria:

- Meet the state definition of threatened or endangered but have not formally been listed.
- Are extirpated from the state totally or in their primary seasonal or breeding role and were never listed as state threatened or endangered.
- Are listed as federally, but not state, threatened or endangered.
- Are experiencing, or formerly experienced, serious (non-cyclical) population declines or range retractions (not reversed) that if continued, or resumed, could qualify them for state threatened or endangered status.
- Have naturally small populations exhibiting high susceptibility to risk from any factor(s) that if realized could lead to declines that would qualify them for state threatened or endangered status.

The Document:

The draft document entitled "California Bird Species of Special Concern 2003, A Ranked Assessment of Species, Subspecies and Distinct Populations of Birds of Immediate Conservation Concern in California" was produced under contract with the Point Reyes Bird Observatory and reviewed by many of the State's top ornithologists as well as knowledgeable land managers and state and federal agency biologists. In it, a method for identifying and ranking "at risk" birds is articulated; 44 full species and 26 subspecies or distinct populations of birds are identified for inclusion on the list. An additional 11 taxa are unranked but included on the list by virtue of being extirpated from the state or included on the Federal but not the State's Threatened and Endangered species list.

A California "Responsibility List" is also included for longer term conservation planning. This list includes 119 taxa so identified because their global populations occurs wholly or mostly within the borders of California. The authors conclude with a set of conservation recommendations for species of special concern.

A comprehensive database showing all species' criteria scores has been updated incorporating recommendations from technical experts and account authors. This database will serve as a baseline upon which future revisions of the document may rely.

Species Accounts and Range Maps:

Species accounts have been prepared for 70 taxa by 45 authors, each author an expert with their given taxon or suite of species. The 11 additional taxa included on the BSSC list by virtue of their status as being extirpated from California or as federally-listed species (although not State-listed) did not require species accounts. Species accounts focus on the taxon's general range and abundance, seasonal status in California, historical and recent range and abundance in California, ecological requirements, and threats; additionally, the authors make management, research and monitoring recommendations. Maps showing current range accompany each account. These maps were subjected to editing for consistency and accuracy by a team of two ornithologists and are currently being digitized through cooperative arrangement with the Wildlife Habitat Relationships program.

A draft of the document, database, and species accounts is currently undergoing peer review. The Department anticipates releasing the final document and associated materials in both print and electronic versions by the end of 2003.

The development of the BSSC has been a highly collaborative process between the Department, PRBO, WFO, as well as numerous ornithologists who have contributed their expertise and judgment to this important state-wide analysis. The final stage of the project will bring the work of this large group of experts to fruition.

VIII. CONCLUSIONS AND RECOMMENDATIONS

Conclusions and Recommendations – 2002 Monitoring Report

The SCR Monitoring Team spent significant time in 2001-2002 conducting biological inventories of land recently purchased by the Department, much of it associated with the development and implementation of the State's NCCP Program. These lands have conserved important biological resources and have provided biological linkages to other conserved lands owned by other agencies and jurisdictions. All of these lands together make up the NCCP preserve systems in different parts of the region. The Department is committed to monitoring these vitally important lands consistent with the monitoring principles and requirements of the various NCCP plans in the region.

The SCR has been able to collaborate with expert contractors, agencies, and volunteers to supplement and assist in-house monitoring efforts to track the status of biological resources in the region. We anticipate continuing our partnerships into the future, not only for biological monitoring but also for research on key species, species groups and habitats, and for adaptive management purposes. The results of these efforts will allow us to refine monitoring protocols to be more effective, and to gain better insights into what should be monitored to assess the health of ecosystems and individual species. Some key collaborators have included: USGS, San Diego Sate University, Conservation Biology Institute, USFWS, Wildlife Research Institute, San Diego Tracking Team, The Nature Conservancy, and the Center for Natural Lands Management.